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A Systematic Review of Business Models for Sustainable Innovation

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Abstract

Frugal and reverse innovations are relatively new yet highly discussed topics in academic and business management circles. These two types of innovation present a shift in the mindset of global business and economy. The paper seeks to provide a literature review on the topic of frugal and reverse innovation and the connection between them. Fifty-two articles were chosen for the final analysis - far too many for a journal article - but the most important fourteen articles were identified after the analysis and are examined here. Through primary content analysis, five major areas have been identified for further evaluation. These topics include the approaches to definitions and understanding of the nature of frugal and reverse innovation, analysis of frameworks for innovations implementation, the issue of diffusion, and the connection of frugal and reverse innovation to sustainability. This systematic review of frugal and reverse innovation highlights existing issues and gaps and suggests directions for future research.

Disciplinary: Management Science, Sustainability.

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1 Introduction

For the development and growth of organisations and firms innovation has always been important. As Crossan and Apaydin (2010) mention in their work that innovation is an important dimension with the help of which competitive advantage can be achieved. The same idea is supported by Klein and Knight (2005).

Frugal and reverse innovation has recently been subject to attention in academic research (Lou, 2016). Innovation is becoming inalienable in the context of economic development. The growing attention to both types of innovation may be explained by the fact that these two types of innovation are considered crucial for modern organisations to retain their advantage in the

changing global market. Rapidly developing economies like China have led to intense competition between organizations vying for customers from these markets (Zeschky et al., 2014). Many enterprises faced significant challenges when adapting to the new markets. Since it would be very difficult to sell products in these markets at the same price level as in Western economies companies had to find such solutions as reverse and frugal innovation. The main idea behind frugal innovation is the pursuit of quality innovations using scarce resources. Reverse innovation on the other hand focuses on the possibility of innovations developed in developing and underdeveloped economies entering mature markets (Govindarajan and Ramamurti 2011). Sustainability must not be neglected when it comes to economic development. Thus, both frugal and reverse innovations are often looked at from the sustainability perspective aiming at analysing what economic, social, and environmental issues arise when it comes to these types of innovation.

According to Winterhalter and Gassmann (2014), frugal and reverse innovations are not the only existing terms that are employed to describe resource-constrained types of innovation. Definitions of various existing types of resource-constrained innovation will be provided followed by a discussion of the primary differences between them.

1.1 Frugal Innovation

Hossain (2017) states that frugal innovation is important for SMEs, NGOs, corporations, and governmental organisations and that it aims at providing opportunities to consumers who belong to the low-income segment. Hossain et al. (2016) defined frugal innovation as a resource-scarce solution which despite constraints is designed and implemented, in a way that the final output is a lot cheaper than the offerings of competitors and is suitable to satisfy the needs of otherwise unserved customers. Frugal innovation originates from resource scarcity according to Sharma and Iyer (2012). The crux behind it is converting disadvantages into a competitive advantage.

1.2 Reverse Innovation

According to Xu and Xu (2016), when it comes to innovations, developed countries are the first to innovate which is then adapted first by the developing countries. In reverse innovation, innovations first take place in the developing countries and are then adapted in the developed countries (Govindarajan and Ramamurti 2011). Reverse innovation has been defined by Hossain, (2016) as a resource-constrained solution introduced first in emerging markets and then transferred to developed economies.

Frugal innovations are meant specifically for low-income markets. Reverse innovation enters advanced markets and may arise from any other type of innovation. A brief overview of the different types of innovation are described; Jugaad innovation a term defined by Pahalad and Mashelkar (2010) is the design of efficient innovation which are low cost in nature for the Indian market, Bottom of the pyramid innovations are innovations that intend to satisfy the needs of poor populations who otherwise would remain unserved (Prahalad, 2004), Cost innovations aim to produce expensive products at a lower cost (Zeng and Williamson, 2007), Lean innovation is an

innovation which aims at eliminating processes that are non-value-adding processes to attain goals with the minimum possible result (Sehested and Sonnenberg, 2010). Grassroot innovation according to Hossain (2016) deals with organizations and activists creating bottom-up solutions aimed at development and consumption which are both sustainable in nature.

There is still a lack of understanding of the way frugal and reverse innovation interact (Agarwal et al., 2019). In the following systematic literature review, we aim at filling that gap by analysing the scientific literature on the topic.

2 Methodology

This work identifies the nature of frugal and reverse innovation, their impacts and their interaction with each other. Tranfield et al. (2009) mention that a systematic review is the most appropriate approach since it enables us to discover, choose, assess and consolidate the existing literature in a replicable and meticulous manner. First, it should be systematic meaning that the review is to be organised on the basis of the chosen methods (Briner and Denyer 2012). Second, it should be clearly stated and transparent. Finally, a systematic review is to be reproducible and synthesized (Briner and Denyer 2012).

Following McWilliams et al. (2005), our systematic review is based on peer-reviewed literature only. For this purpose, the search for relevant materials has been conducted using mainly the EBSCOhost database of scholarly articles. To ensure that all provided information is up to date and relevant, we have limited the date range of accepted publications. Thus, we have chosen articles that are no more than fifteen years old.

2.1 Data Collection

The data collection technique is based on the concept of systematic literature review as suggested by Tranfield (2003). The first stage of data collection included the creation of a keywords list for the primary search. Two primary keywords have been identified, namely ‘reverse innovation’ and ‘frugal innovation’. Additionally, the following keywords have been utilised in the literature search: ‘frugal innovation in emerging markets, ‘reverse innovation in emerging markets, ‘frugal and reverse innovation’, ‘frugal innovation and sustainability, and ‘reverse innovation and sustainability. The second stage of the literature search comprised the primary literature search via EBSCOhost. Two main keywords have been used at this stage. As a result of the primary research for keywords ‘frugal innovation’ and ‘reverse innovation’ 3,706 results and 5,678 results have been found in EBSCOhost respectively. Titles and abstracts screening was the third stage of our systematic literature review. Titles and abstracts were screened based on inclusion criteria. The inclusion criteria include 1) the article has been published less than ten years ago 2) in its title and/or abstract, one of several of identified keywords is mentioned, 3) the article is written in the English language and 4) the content of abstracts have been evaluated from the perspective of its usefulness for the aim of this review. As a result of this stage completion, 326 articles have been chosen for further review. The final stage of the systematic literature review was the thorough analysis of the full content of chosen articles.

2.2 Data Analysis

The data analysis presupposed reading of a full text of the article and identifying whether it should be a part of the literature review. In this context, fifty-two articles have been chosen for systematic review.

We have used both inductive and deductive methods of content analysis of articles. Also, we have followed Nijmeijer et al. (2014) recommendation to analyse design peculiarities of chosen publications first. We have synthesized all data by comparing definitions, approaches to description, framework, and other issues in all articles. In such a way, we aimed at ensuring that we gather all necessary data for narrative synthesis that would assist us in exploring the relationships between data as suggested by Popay *et al*. (2016).

3 Results

Several articles were identified after analysis as being importantly related to frugal and reverse innovation and based on them the results were generated.

The similarity between types of innovations is that they aim at offering value using limited resources. The main goal of these innovations is that the main focus is on the target market rather than developing the product at a low cost even though that is ultimately achieved as well.

3.1 The Nature of Frugal and Reverse Innovation

3.1.1 Frugal Innovation

Halme et al. (2012) mention in their work that it is important to realize that targeting emerging markets require a different strategy as compared to developed markets. And this is the main reason why frugal innovations are important. Simula *et al.* (2015) in their work state that these innovations help solve problems of a daily nature as well as provide critical solutions for enterprises.

3.1.2 Reverse Innovation

Four important parameters exist in reverse innovation that helps in a better understanding of the phenomenon (Zedwitz et al., 2015). First, the home country is not the primary market for which the product is produced. Second, products meant for emerging markets become better than other products elsewhere. Third, product development is not utilised in developed countries only. Fourth, organizations devise new products in addition to developing existing products and hence cater to both developed and developing markets.

3.2 Implementing Frugal and Reverse Innovation in Organisations

3.2.1 Frugal Innovation

A lot of Western organisations because of frugal innovation development have started to depend on emerging markets according to Altman and Engberg (2016). According to Colledani et al. (2016) since these firms may not have enough knowledge about the local market they may want to rethink their business processes. However, this is a challenging process that may be realised via various approaches (Pisoni et al., 2018). Core product modification according to Lim et al. (2013) is

the first approach in emerging markets for the implementation of frugal innovation. It is suggested to use this approach when issues like poor product design or the failure of the offering to satisfy customer needs arise. The presence of partners who are local in nature is imperative for understanding required modifications according to Corsi, Di Minin, and Piccaluga 2014; they also recommend another approach to the implementation of frugal innovation which is value engineering. Value engineering is preferred in scenarios when Western firms are confronted with issues in adapting to the local business environment and model.

3.2.2 Reverse Innovation

According to Winter and Govindarajan (2015), reverse innovation starts from the successful frugal innovation first. According to Govindrajan (2012), the success of reverse innovation is challenging as it involves discarding old structures, existing product development methods, and the existing sales force and developing new ones from zero. Zhu (2017) conducted a study devoted to the identification of factors that should be evaluated. The results have demonstrated that the degree of needed adaptation and the risk of cannibalisation should be evaluated by firms. An evaluation may show that financial investments would be necessary but that would lead to a higher cost and eventually a loss of competitive advantage according to Govindarajan et al. (2012).

3.3 Diffusion of Frugal and Reverse Innovation

Even though many studies exist and provide important insights with regards to the diffusion of frugal and reverse innovation the topic has not been researched in detail yet. Peng and Vlas (2017) were amongst the first to shed light on three important aspects of the diffusion of innovation. First that diffusion of innovation is considered a new concept, second that it takes time in spreading from one domain to another and third that its adoption may be realized on three levels, either at the level of an individual, at the level of a particular group or the level of higher authority like the government. Diffusion is a process in which an innovation spreads in the market among members of the market when it is communicated through certain channels over time (Ray and Ray (2010).

Hossain et al. (2016) have conducted research aimed at understanding the patterns of diffusion of frugal innovation which according to them are of four types. Local diffusion is when innovation is accepted in one unit, proximity diffusion is when innovation is spread to neighboring units with similar environmental conditions, distance diffusion is when innovation is spread to distant units with similar environmental conditions and global diffusion is when a product that has been created and meant for a developing country is adopted by developed countries.

Many factors according to Mannan et al. (2017) determine the success of the adoption of innovation in the new country. Harris *et al*. (2016) mention that the success of the diffusion of reverse innovation in the developed country is many times determined by the biases related to the country of origin of the product, Africa being an example, they term this as a paradox of reverse innovation.

3.4 Sustainability vis-a-vis Frugal and Reverse Innovation

Sustainability is a crucial concept for every business these days. As businesses are becoming involved in the implementation of new innovations, the question of sustainability of these innovations arises. Sustainable innovations according to Rosca et al. (2017) are inventions that provide important progress related to concerns of a social, economic, and ecological nature. Three aspects should be taken into consideration when it comes to sustainability. These are economic, environmental, and social aspects of sustainability. Rosca et al. (2017) have evaluated the connection between all three aspects of sustainability and frugal and reverse innovation. They have employed multiple case designs and studied fifty-nine cases to be able to draw particular conclusions and have concluded that sustainability is not essential to frugal and reverse products and services.

3.4.1 The Economic Aspect of Sustainability

Bas (2016) states that it is the primary target of frugal and reverse innovation to increase the purchasing power of individuals with various levels of income. The connection between frugal innovation has also been investigated by Levänen *et al.* (2015) and they found out that frugal innovation saved the money of customers in two of four cases. The same result has been found in studying the relation between frugal innovation and the creation of new employment opportunities and enterprises (Levänen *et al.* 2015; Akhtar et al., 2019).

3.4.2 The Ecological Aspect of Sustainability

Bas (2016) mentions that frugal and reverse innovations demonstrate particular green properties considering their low technological complexity, these properties include easy and quick repair in case of breakdown and possible recycling of end-of-life components. Rosca et al. (2017) state that innovations that are frugal and reverse in nature demonstrate the decrease in the use of production material energy and water consumption.

3.4.3 Social Aspects of Sustainability

In Khan (2016), frugal innovation techniques have demonstrated their efficiency for society in numerous cases. Hyvärinen et al. (2016) give an example of the case of development water filters that could be bought at a lower price, but they give people access to clean and safe water at the same time. Similar examples of the impact of frugal and reverse innovations on social sustainability may be found in studies of Tran and Ravaud (2016), Pansera and Sarkar (2016) and Rowthorn et al. (2016).

4. Conclusion

The systematic review of the literature provided us with the opportunity to gather and evaluate the existing literature. We have managed to identify the most debatable topics when it comes to frugal and reverse innovation and has evaluated a substantial amount of literature to understand the nature of both concepts. Finally, we have succeeded in finding the connection between frugal and reverse innovation.

Future research needs to examine the possible frameworks of frugal and reverse innovations implementation. Considering the importance of sustainability, frugal and reverse innovation should be studied from this perspective as well. To highlight the most important findings of our systematic literature review, frugal and reverse innovation are relatively new and there is still a lack of unity of thoughts on their proper definition. All reverse innovations are by nature frugal but not all frugal innovations are reverse. Diffusion of frugal and reverse innovation as a topic still requires additional research. Finally, we have managed to demonstrate that there is a connection between frugal and reverse innovation and sustainability and that they have a presumably positive impact on the environment.

4 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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